OPERATING SUMMARY

1974

CITY OF

NORTH BAY

WATER POLLUTION CONTROL PLANT

Ontario

MINISTRY OF THE ENVIRONMENT

MINISTER
Honourable William G. Newman

DEPUTY MINISTER
E. Biggs

ASSISTANT DEPUTY MINISTER
REGIONAL OPERATIONS
J. Barr

REGIONAL OPERATIONS DIVISION

DIRECTOR, NORTHEASTERN REGION
R. Moore

MANAGER, UTILITY OPERATIONS
J. Wesno

NORTH BAY

WATER POLLUTION CONTROL PLANT

operated for

THE CITY OF NORTH BAY

by the

MINISTRY OF THE ENVIRONMENT

1974 ANNUAL OPERATING SUMMARY

prepared by

Plant Performance Unit

TECHNICAL SERVICES BRANCH

T. Cross, Director

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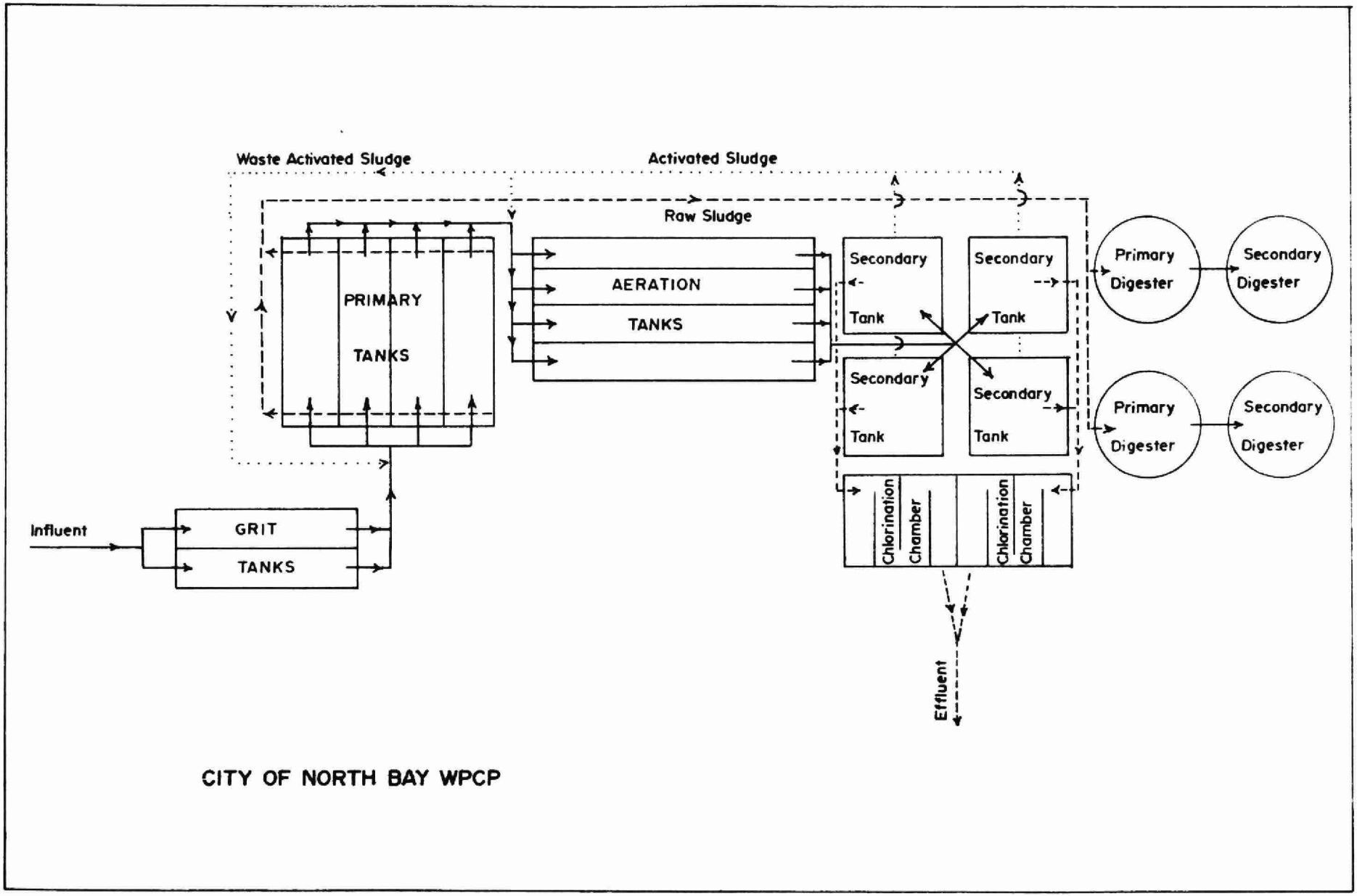


CITY OF NORTH BAY WPCP

DESIGN DATA

PROJECT: City of North Bay WPCP

PROJECT NUMBER: 2-0010-58

TREATMENT: Activated Sludge

DESIGN FLOW: 8.0 mgd

BOD - Raw Sewage 150 mg/l
- Removal 85%

PRIMARY TREATMENT

GRIT REMOVAL
Type: Aerated grit tanks
Size: two, (each) 48' x 16' x 7.8' awl
(each: 37,380 I.G.)
Retention: (each) 6.8 min

SCREENS
Type: two, Mechanical

SEWAGE LIFT PUMPS
Type: WORTHINGTON
Two, variable-speed
One, constant-speed
Size: (total) 16 mgd

PRIMARY SEDIMENTATION
Type: Four, 90' x 30' x 11'
(741,300 I.G. total)
Retention: 2.2 hr

SECONDARY TREATMENT

AERATION TANKS
Type: Diffused Air, two-pass
Size: Two, 185' x 20' x 12' per pass
(1,108,000 I.G. total)
Retention: 3.3 hr

RETURN SLUDGE PUMPS
Type: WORTHINGTON
Size: Two, 550 gpm

SECONDARY SEDIMENTATION
Type: WALKER RSX
Size: Four, 60' x 60' x 11'
(988,400 I.G. total)
Retention: 3.0 hr
Loading: Surface-550 gal/ft^2/day
Weir - 8,000 gal/ft/day

CHLORINATION
Type: four-pass
Size: two, 39' x 7.8' x 6.5' each pass
(98,700 I.G. total)
Retention: 18 min.

OUTFALL
-1,000 ft into Lake Nippissing

SLUDGE HANDLING

DIGESTION SYSTEM
Type: Two-Stage

Primary --
Type: DORR
Size: Two, 65' dia x 22' swd
(911,000 I.G. total)

Secondary --
Size: Two, 65' dia x 22' swd
(911,000 I.G. total)

'74 Review

GENERAL

The North Bay sewage system consists of an 8.0 mgd conventional activated sludge treatment plant, collector sewers and approximately 20 pumping stations, of which the plant, some sewers and 5 pumping stations were financed and constructed by the Ministry of the Environment. A plant staff of 10 operate the Ministry facilities and, in addition, provide emergency electrical service for all the pumping stations.

The plant expansion from 4 mgd to 8 mgd was completed in August 1974. The additional treatment works include new primary and secondary clarifiers, 2 new primary digesters, and facilities for phosphorus removal treatment. Two additional staff members were hired in October 1974 in order to assist in the operation of the expanded plant.

In order to facilitate better sludge handling and reduce sludge haulage costs, additional treatment facilities for dewatering sludge will be provided in 1976. It is proposed that test trials of various type centrifuges for this purpose will be conducted in the summer of 1975. The purchase of the centrifuge will be carried out late in the year with an expected installation date of November, 1976.

OPERATING COSTS

The total operating cost for the project in 1974 was $211,089. The cost per million gallons of sewage treated during 1974 was approximately $91.00.

PLANT FLOWS AND CHLORINATION

Flows to the plant increased by approximately 5 percent over the 1973 flows. A total flow of 2,320 million gallons was treated in 1974 which represents an average daily flow of 6.4 million gallons per day, compared with 6.1 million gallons per day in 1973. This represents 80 percent of the plant design capacity of 8.0 mgd. The per capita flow contribution based on a serviced population of 50,000 was 122 gpd.

A total of 87,800 pounds of chlorine was used to disinfect the effluent at an average dosage of 3.8 mg/l.

PLANT EFFICIENCY

The average raw sewage strength was 153 mg/l BOD and 255 mg/l suspended solids. The total loading to the plant in 1974 was 3,549,600 pounds of BOD and 5,916,000 pounds of suspended solids. Of these totals, 2,576,200 pounds of BOD and 4,802,400 pounds of suspended solids were removed by the treatment process, representing a removal efficiency of 73 percent and 81 percent respectively.

The average phosphorus level in the influent for the year was 8.4 mg/l. The average level in the effluent after treatment commenced in August was 1.5 mg/l, which represents a removal efficiency of 82 percent.

AERATION

The average BOD loading of 98 mg/l to the aeration section represented an average organic loading of 35.3 pounds BOD per 1,000 cubic feet of aeration tank capacity. The mixed liquor suspended solids concentration averaged 2,600 mg/l and the F/M ratio averaged 0.28.

SLUDGE DIGESTION AND DISPOSAL

A total of 8.62 million gallons of raw sludge was pumped to the primary digester at an average concentration of 5.3 percent total solids. Digestion and supernatant return reduced the total quantity to 3.35 million gallons at a total solids concentration of 6.3 percent.

A total of 19,902 cubic yards of sludge was removed from the digester by tank truck. Of this total 12,238 cubic yards were spread directly on local farm fields while a further 7664 cubic yards were mixed with sawdust and composted before being spread on fields.

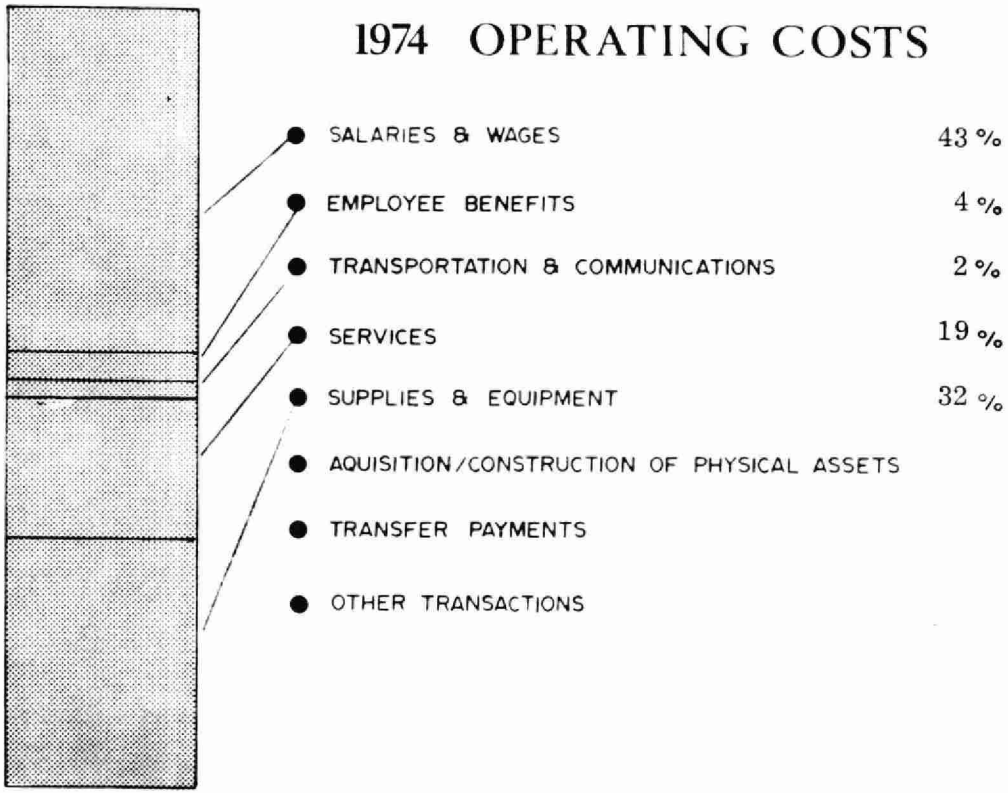
A total of 5582 cubic feet of grit was removed from the plant in 1974. This represents 2.4 cubic feet per million gallons of sewage treated.

CONCLUSIONS

The plant went through a transition period in 1974 in which new treatment facilities were installed and put into service. It is expected that improved plant performance will reflect the plant's new treatment capability.

ANNUAL COSTS

1974 OPERATING COSTS



YEARLY OPERATING COSTS

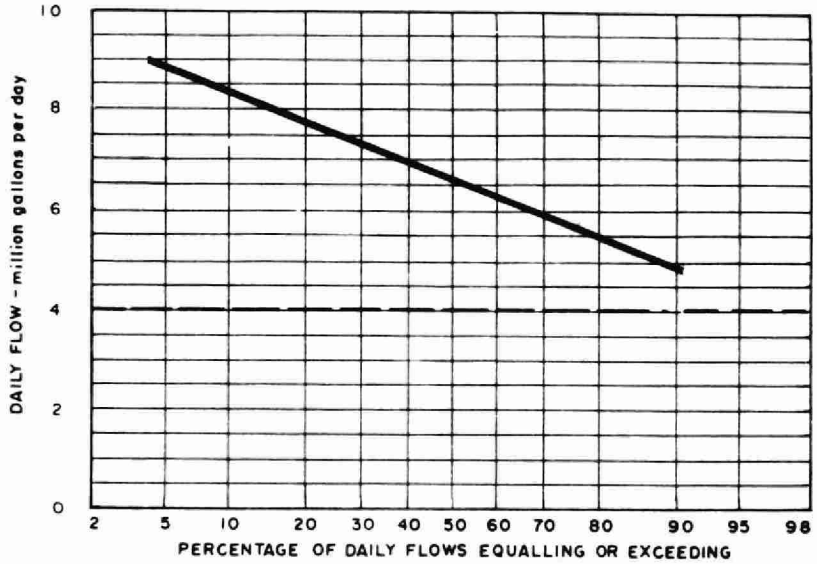
YEAR	SEWAGE TREATED in million gallons	TOTAL OPERATING COSTS	UNIT COSTS $/M G	UNIT COSTS ¢/lb BOD
1969	1777	121,523	68	7
1970	1957	139,983	72	7
1971	1863	157,917	85	5
1972	1865	184,877	99	9
1973	2218	165,845	74	7
1974	2320 Est.	211,089	91	8

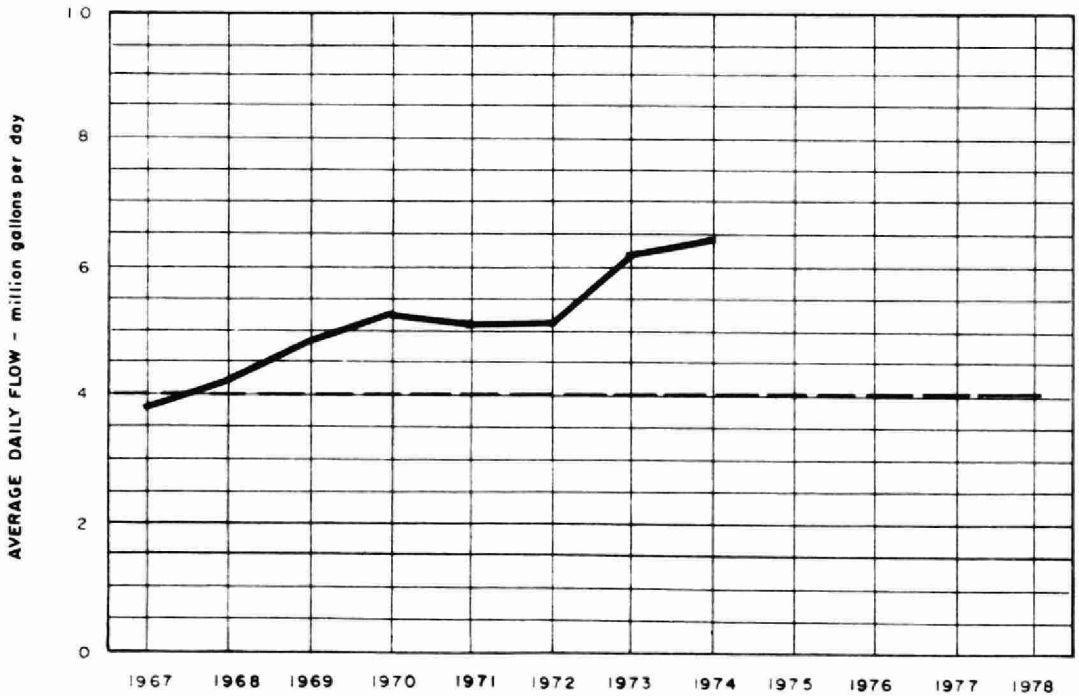
OPERATING EXPENDITURES

Regular Staff	$ 85,320	$
Casual (Unclassified) Staff	2,874	
TOTAL SALARIES AND WAGES		88,194
TOTAL EMPLOYEE BENEFITS		8,646
TOTAL TRANSPORTATION AND COMMUNICATIONS		3,967
Insurance	3,490	
Sludge Haulage	32,556	
Repairs and Maintenance	2,722	
Other Services	1,080	
TOTAL SERVICES		39,848
Machinery and Equipment	1,435	
Chemicals	20,257	
Utilities	41,689	
Other Supplies and Equipment	4,854	
TOTAL SUPPLIES AND EQUIPMENT		68,235
TOTAL AQUISITION/CONSTRUCTION OF PHYSICAL ASSETS		-
TOTAL TRANSFER PAYMENTS		-
OTHER TRANSACTIONS		2,199
GRAND TOTAL	GRAND TOTAL	$ 211,089

PROCESS DATA

FLOWS



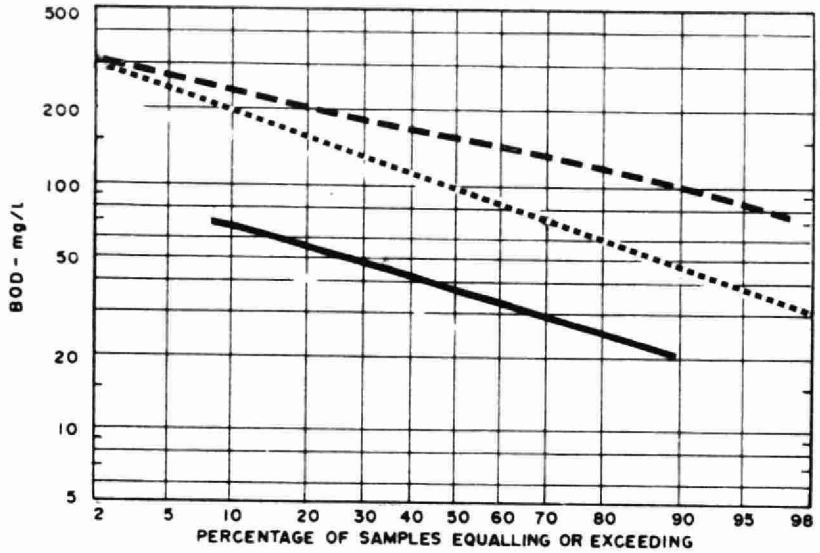


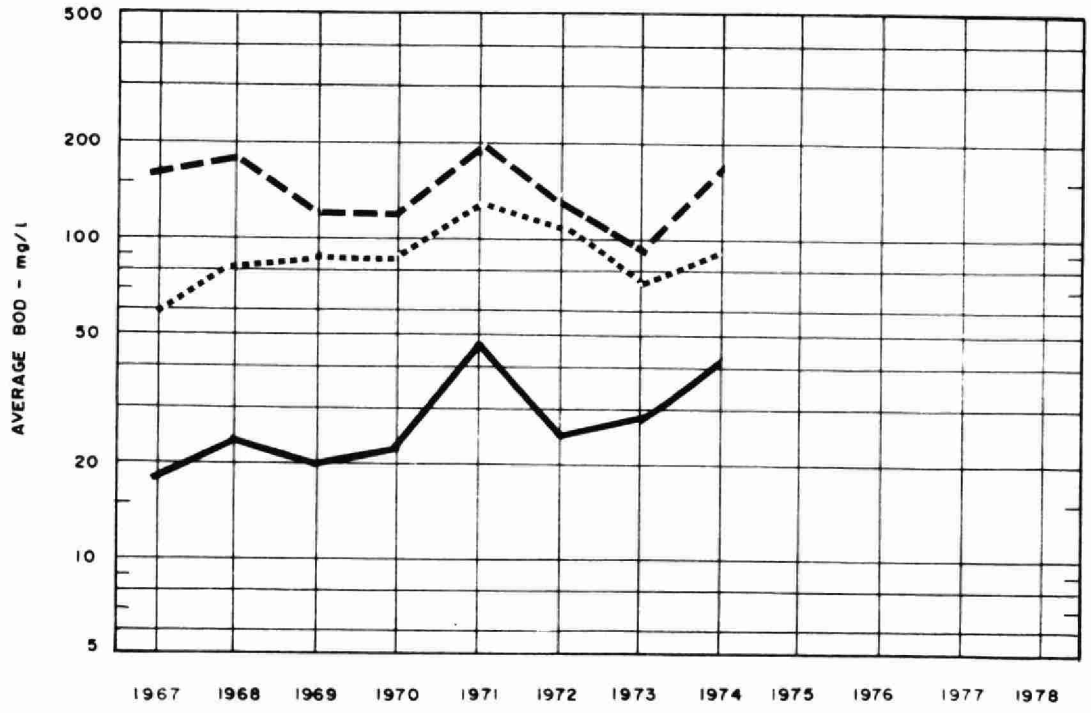
DESIGN CAPACITY _ _ _ _ _ _ _

PLANT PERFORMANCE

MONTH	FLOWS			BIOCHEMICAL OXYGEN DEMAND				SUSPENDED SOLIDS				PHOSPHORUS	
	TOTAL FLOW	AVERAGE DAY	MAXIMUM DAY	INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT	REDUCTION		INFLUENT	EFFLUENT
	million gallons	mil. gal	mgd	mg/l	mg/l	%	10^5 pounds	mg/l	mg/l	%	10^5 pounds	mg/l P	mg/l P
JAN	182	5.9	7.5	183	42	77	2.6	359	46	87	5.7	5.7	3.0
FEB	172	6.1	7.2	149	51	66	1.7	238	55	77	3.1		
MAR	203	6.5	8.2	181	45	75	2.8	191	48	75	2.9		
APR	236	7.9	9.3	154	51	67	2.4	128	67	48	1.4		
MAY	221	7.1	11.0										
JUNE	198	6.6	8.6										
JULY	158	5.1											
AUG	167	5.4		160	22	86	2.3	295	36	88	4.3	16.8	1.0
SEPT	169	5.5	7.9					357	53	85	5.1	8.6	1.5
OCT	202	6.5	7.7	148	30	80	2.4	335	36	89	6.0	6.9	1.7
NOV	247	8.2	13.5	114	37	68	1.9	196	48	76	3.7	5.5	1.0
DEC	165	5.3	6.3	108				193	43	78	2.4	6.1	1.2
TOTAL	2320	-	-	-	-	-		-	-	-		-	-
AVG.		6.4	MAXIMUM 13.5	153	42	73	2.1	255	48	81	5.3	8.4	1.5
No. of Samples	-	-	-	60	46	-	-	140	137	-	-	22	16

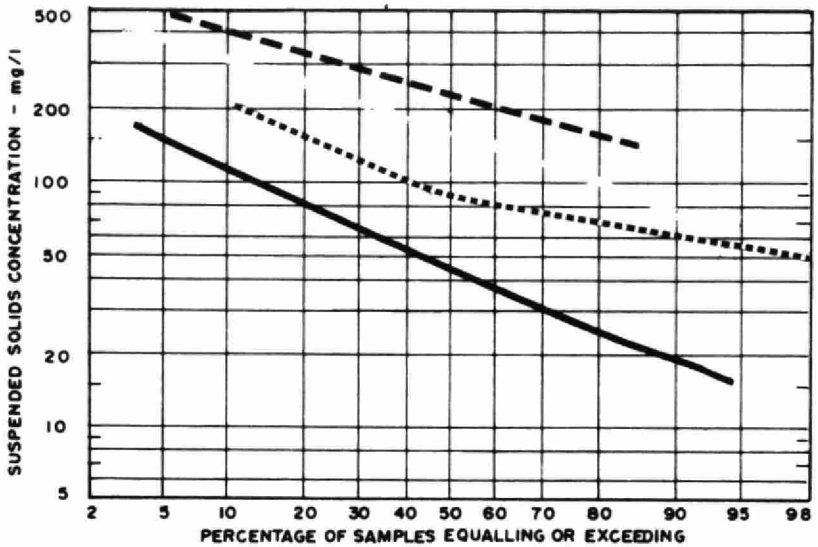
BIOCHEMICAL OXYGEN DEMAND

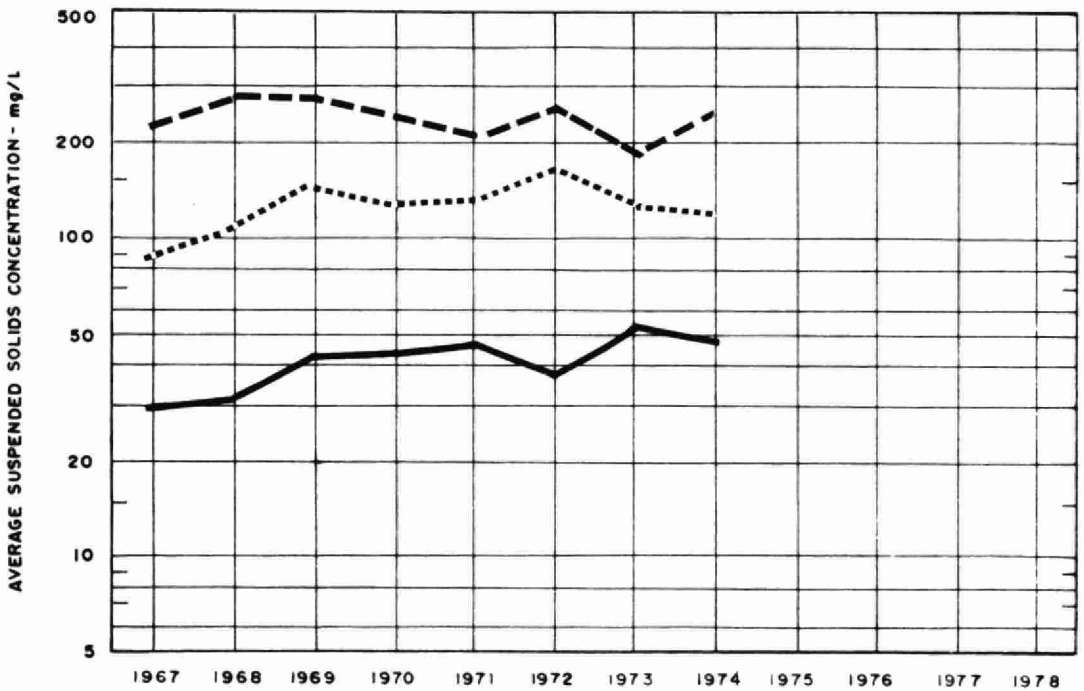




PLANT INFLUENT
PRIMARY EFFLUENT
PLANT EFFLUENT

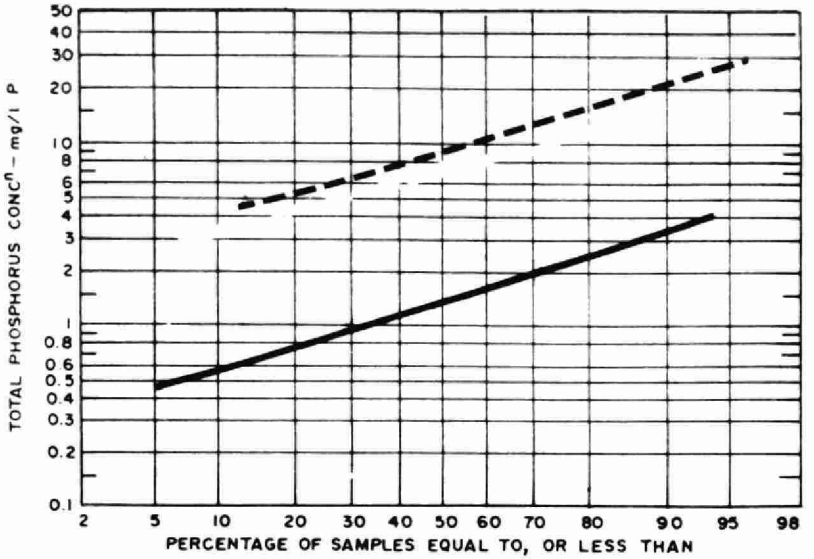
SUSPENDED SOLIDS

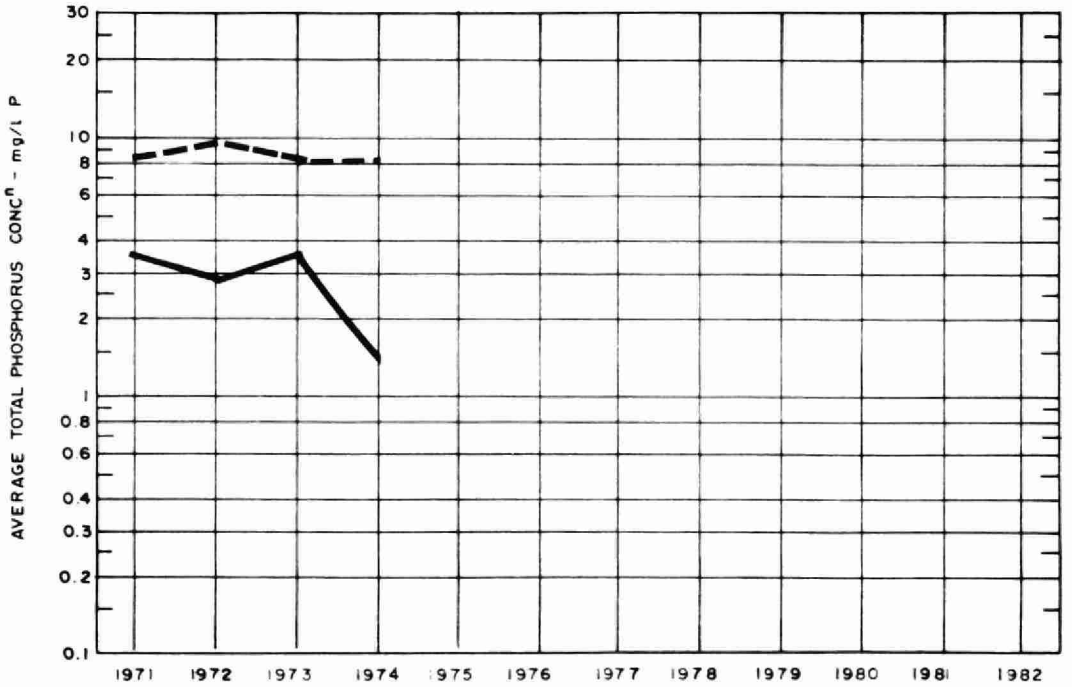




PLANT INFLUENT
PRIMARY EFFLUENT
PLANT EFFLUENT

PHOSPHORUS

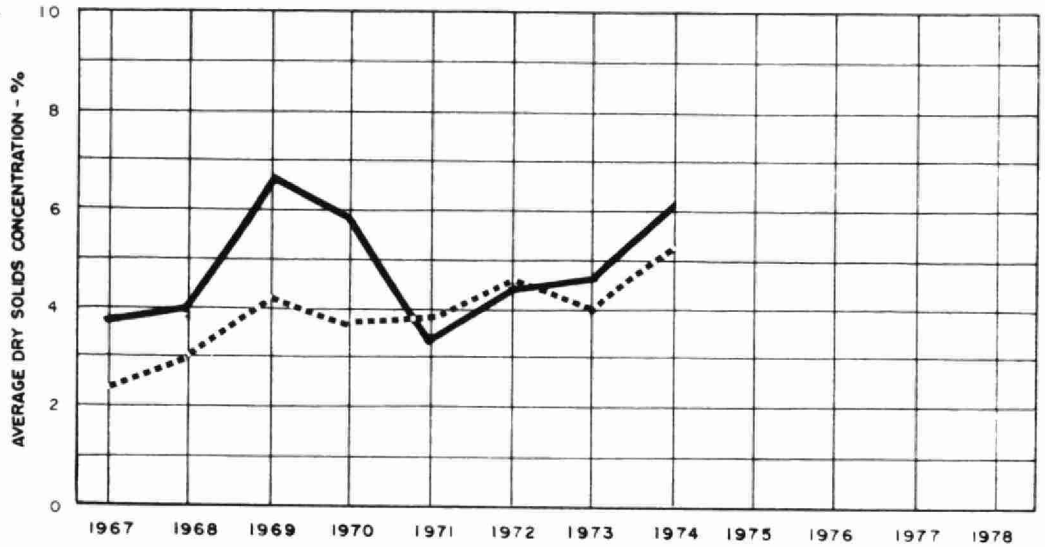


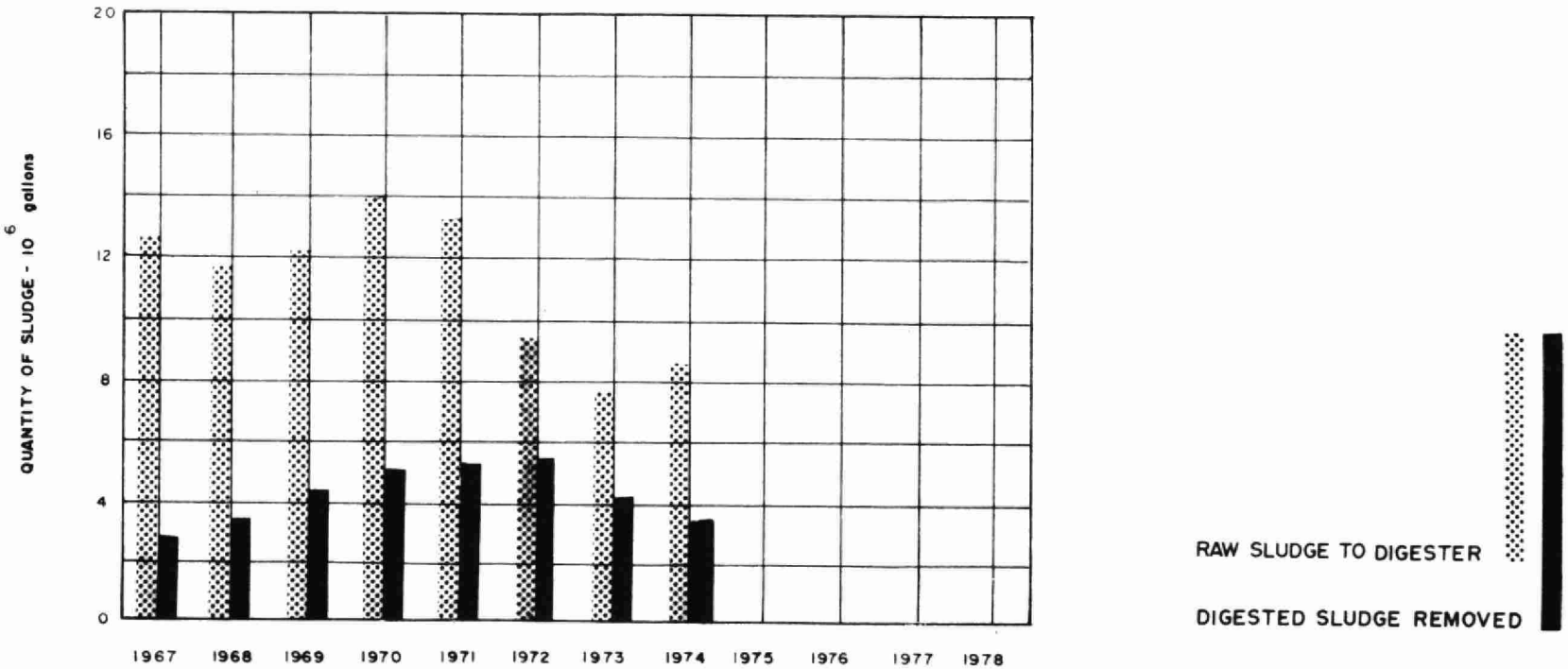


PLANT INFLUENT

PLANT EFFLUENT

DIGESTION


AVERAGE DRY SOLIDS CONCENTRATION - %
0
2
4
6
8
10
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE
DIGESTED SLUDGE


QUANTITY OF SLUDGE - 10^6 gallons
0
4
8
12
16
20
1967
1968
1969
1970
1971
1972
1973
1974
1975
1976
1977
1978
RAW SLUDGE TO DIGESTER
DIGESTED SLUDGE REMOVED

TREATMENT DATA

MONTH	GRIT	CHLORINATION		PRIMARY EFFLUENT		AERATION			SLUDGE DIGESTION and DISPOSAL							
									RAW SLUDGE			DIGESTED SLUDGE			SUPER-NATANT	
	QUANTITY REMOVED	Cl_2 USED	AVG. DOSE	BOD	SUSPENDED SOLIDS	MLSS CONC	F/M	AIR	QUANTITY	TOTAL SOLIDS	VOL. SOLIDS	QUANTITY	TOTAL SOLIDS	VOL. SOLIDS	T. S.	AMOUNT HAULED
	cubic feet	10^3 pounds	mg/l	mg/l	mg/l	mg/l	day^{-1}	$\frac{1000\ ft^3}{lb\ BOD}$	10^6 gallons	%	%	10^6 gallons	%	%	%	cubic yards
JAN	718	9.4	5.1	126	133	1700	.40	1.2	.70	4.6	74	.47	4.8	70	.4	2795
FEB	646	6.8	3.9	136	221	1900	.40	1.1	.36	6.0	72	.28	5.9	63		1693
MAR	836	8.8	4.3	150	171	2000	.44	.8	1.07	4.4	67	.56	3.9	70	.1	3312
APR	1088	9.1	3.8	135	110	2000	.48	.8	.68	5.3	63	.19	9.1	66	.1	1128
MAY	502	8.4	3.8						.70			.15				910
JUNE	926	9.4	4.8						.68			.21				1219
JULY	579	8.1	5.1						.89			.26				1547
AUG	40	5.8	3.4	55	88	1700	.16	3.1	.89	10.1	53	.20	6.5	48	1.3	1201
SEPT		6.6	3.9		102	3400			.54	5.5	61	.35	7.1	57	2.9	2075
OCT		5.0	2.5	80	111	3300	.14	1.9	.88	4.6	67	.58	6.1	62	1.8	3404
NOV	247	6.1	2.8	51	70	2800	.14	1.8	.66	4.0	64					
DEC		4.3	4.5	52	88	4600	.11	2.3	.57	3.6	65	.10				618
TOTAL	5582	87.8	–	–	–	–	–	–	8.62	–	–	3.35	–	–	–	19902
AVG.	2.4 cu. ft/mil gal	7.3	3.8	98	122	2600	.28	1.6	.72	5.3	65	.28	6.2	62	1.1	1659

Date Due

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